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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/543,247 04/05/00 TAKEDA

S 7426-063

EXAMINER

MM91/0910

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ART UNIT

PAPER NUMBER

2814

DATE MAILED:

09/10/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/543,247

Applicant(s)

TAKEDA ET AL.

Examiner

David E Graybill

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>5</u> . | 6) <input type="checkbox"/> Other: _____ |

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Claims 42, 50 and 51 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are the following:

In claim 42, those between the chip, the member and the material;

In claims 50 and 51, those between the device and the material.

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 42, 50 and 51 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any structure or steps involved in the product or process, results in an improper definition of a product or process, i.e., results in a claim which is not a proper product or process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 19, 20, 21, 23 and 34-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 19, 20 and 23 the term "at a stage" is ambiguous and unclear.

In claims 34 and 37 the term "silicon resin" is not an art recognized term, and it appears to be incorrect.

Claim 40 is rejected as incomplete because it depends on canceled claim 1.

In claim 41 the limitation that the film comprises an inorganic filler is incompatible with the claims 27 limitation that the film is an organic film.

Claims 42, 50 and 51 provide for the use of a material according to claims 17 and 27, respectively, but, since the claims do not set forth any structure or steps involved in the product or process, it is unclear what structure or steps applicant intends the claims to encompass. A claim is indefinite where it merely recites a product without structure or a use without any active, positive steps delimiting how this use is actually practiced.

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In claim 46 there is insufficient literal antecedent basis for the terms "the support member," and "the semiconductor chip."

Claims 42, 50 and 51 provide for the use of a material according to claims 17 and 27, respectively, but, since the claims do not set forth any structure or steps involved in the product or process, it is unclear what structure or steps applicant intends the claims to encompass. A claim is indefinite where it merely recites a product without structure or a use without any active, positive steps delimiting how this use is actually practiced.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17, 22, 25, 27, 34, 35, 37, 38 and 41-51 are rejected under 35 U.S.C. 102(a) as being anticipated by Morita (5406124).

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At column 3, line 63 to column 4, line 35; column 7, lines 6-9; column 8, lines 1-8 and 24-47; column 9, lines 14-35; column 10, lines 14-15; column 14, lines 3-14 and 40-46; column 16, lines 18-34; column 17, lines 13-14; and column 18, lines 1-10 and 29-30 Morita teaches the following:

17. A material 4 comprising an organic die-bonding film having a water absorption of 1.5% by volume or less.

22. A material according to claim 17, said material having a modulus of elasticity of 10 MPa or less at a temperature of 250°C.

25. A material comprising an organic die-bonding film having a residual volatile component in an amount of not more than 3.0% by weight.

27. A material comprising an organic die-bonding film having a modulus of elasticity of 10 MPa or less at a temperature of 250°C.

34. A material according to claim 17, including at least one component selected from an epoxy resin, a silicon resin, an acryl resin and a polyimide resin.

35. A material according to claim 34, said component including a polyimide resin.

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37. A material according to claim 27, including at least one component selected from an epoxy resin, a silicon resin, an acryl resin and a polyimide resin.

38. A material according to claim 37, said component including a polyimide resin.

41. A material comprising an organic die-bonding film according to claim 27, further including an inorganic filler.

42. A method of bonding a semiconductor chip to a support member wherein said material comprising an organic die-bonding film according to claim 17 is used for said bonding.

43. A method of bonding according to claim 42, wherein said bonding is carried out at a temperature of 100 - 350°C for a time period of 0.1 second - 20 seconds with a pressure of 0.1 - 20gf/mm².

44. A method of bonding according to claim 43, wherein said bonding is carried out at a temperature of 150 - 250°C for a time period not longer than 2 seconds, with a pressure of 4 gf/mm² or less.

45. A method of bonding according to claim 44, wherein said bonding is carried out for a time period 1.5 seconds or less, with a pressure of 0.3 - 2 gf/mm².

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46. A method of bonding the support member to the semiconductor chip with a material comprising an organic die-bonding film according to claim 27.

47. A method of bonding according to claim 46, wherein said bonding is carried out at a temperature of 100 - 350°C for a time period of 0.1 second - 20 seconds with a pressure of 0.1-20 gf/mm².

48. A method of bonding according to claim 47, wherein said bonding is carried out at a temperature of 150 - 250°C for a time period of less than 2 seconds with a pressure of 4 gf/mm².

49. A method of bonding according to claim 48, wherein said bonding is carried out for a time period of 1.5 seconds or less with a pressure of 0.32 gf/mm².

50. A semiconductor device manufactured using a material comprising an organic die-bonding film according to claim 17.

51. A semiconductor device manufactured using a material comprising an organic die-bonding film according to claim 27.

Claim 28 is rejected under 35 U.S.C. 102(b) as being anticipated by Hozoji (JP5-218107).

In the English abstract and Table 1, Hozoji teaches the following:

28. A material comprising an organic die-bonding film having a void volume of 10% or less in terms of voids present in

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the material and at an interface between said material and a support member at a stage where a semiconductor has been bonded to said support member.

To further clarify the teaching of a void volume of 10% or less, it is noted that Hozoji teaches that "a defect such as a void, etc., is eliminated."

Claims 18, 24, 26, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita as applied to claims 17, 22, 25, 27, 34, 35, 37, 38 and 41-51, and further in combination with Hozoji (JP5-218107).

Morita does not appear to explicitly teach the following:

18. A material according to claim 17, having a saturation moisture absorption of 1.0% by volume or less.

24. A material comprising an organic die-bonding film having a saturation moisture absorption of 1.0% by volume or less.

30. A material according to claim 29, having a saturation moisture absorption of 1.0% by volume or less.

Regardless, in the English abstract and Table 1, Hozoji teaches a material having a saturation moisture absorption of 1.0% by volume or less. Furthermore, it would have been obvious to combine the product of Hozoji with the product of the applied prior art because it would facilitate adhesion.

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Claims 19, 20, 21, 23, 29, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita.

Morita is applied for the reasons it was applied to claims 17, 22, 25, 27, 34, 35, 37, 38 and 41-51 and further applied *infra*.

Although Morita teaches a material at a stage where a semiconductor has been bonded to a support member using the material, Morita does not appear to explicitly teach that the material has a peel strength of 0.5 kgf/5 mm x 5 mm chip or higher at the stage.

Moreover, it cannot be determined if the teaching of Morita of a 90 degree peel strength of 67g/10mm² chip is equivalent to the instant disclosure of a 17 degree peel strength of 0.5 Kgf/5 x 5 mm chip or above because the conversion factor between the two different peel strength measuring techniques is unknown. Nonetheless, as cited, Morita teaches that an increase in peel strength is desirable, and it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed peel strength range because applicant has not disclosed that the range is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears *prima facie* that the product

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and process would possess utility using another range. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

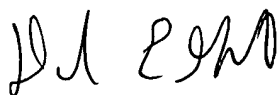
Claims 36 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita as applied to claims 21 and 34, and further in combination with Yusa (5667899).

At column 1, line 63 to column 5, line 2; and column 13, lines 23-25 Yusa teaches an epoxy resin being a glycidyl ether epoxy resin. In addition, it would have been obvious to combine the product of Yusa with the product of Morita because it would provide a material.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to the group receptionist whose telephone number is 703-308-1782.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/305-3431.



David E. Graybill
Primary Examiner
Art Unit 2814